

What is claimed is
Claims

1. A method of synchronising nodes of a telecommunication network in which a master node is coupled to a Primary Reference Clock (PRC) and a plurality of slave nodes are each arranged to synchronise their internal clock to the PRC using data received on incoming data link, the method comprising:
- 5 propagating Synchronisation Status Messages through the network from the master node, with each node through which a message passes incorporating into the message its own identity, thereby generating in each message a path which has been followed by the message;
- 10 introducing a delay in the propagation of the messages at at least certain of the network nodes; and
- for each of at least some of the incoming links of each node, registering the path or path length of a Synchronisation Status Message received on that link as an attribute for that link.
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2. A method according to claim 1 and comprising selecting that incoming link having an attribute indicating the shortest path length from the master node as the link to synchronise on.
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3. A method according to claim 1 and comprising propagating Synchronisation Status Messages on initialising a new network.
4. A method according to claim 1 and comprising sending Synchronisation Status Messages periodically or at other intervals thereafter in order to enable the network to cope with dynamic changes in network architecture.
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5. A method according to claim 1, wherein Synchronisation Status Messages are generated in response to receipt at the master node of a Synchronisation Status Request Message sent from another network node.
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6. A method according to claim 1 and comprising generating a Synchronisation Status Message at a slave node in response to receipt at that slave node of a

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Synchronisation Status Request Message sent from a neighbouring slave node, with the Synchronisation Status Message including an identification of the path over which the sending slave node has been synchronised.

- 5 7. A method according to claim 1, wherein a node through which a Synchronisation Status Message passes adds to the message its own distance from the master node and, for each incoming link, a node registers the distance included in a Synchronisation Status Message received on that link as an attribute for that link.
- 10 8. A method according to claim 1, wherein the network is a UMTS network.
9. A method according to claim 1, wherein the delay introduced by a slave node is the same for all slave nodes which introduce a delay.
- 15 10. A method according to claim 1, wherein the delay increases with distance from the master node.
11. A method according to claim 1, wherein the delay to be introduced by a node for a Synchronisation Status Message is identified in the Synchronisation Status Message.
- 20 12. A method according to claim 1, wherein the delay to be introduced by a node for a Synchronisation Status Message is defined by a delay table stored at the node.
13. A telecommunications network comprising a master node coupled to a Primary Reference Clock (PRC) and a plurality of slave nodes, each of the slave nodes being arranged to synchronise their internal clock to the PRC using data received on incoming data link, each of the slave nodes comprising:
- 25 means for receiving on the or each of at least some of the incoming links to the node, a Synchronisation Status Message incorporating the identities of the nodes through which the message has passed;
- 30 means for registering the path or path length of the Synchronisation Status Message as an attribute for the link on which it was received;

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means for incorporating into one of said messages the identity of the node, thereby generating in the message a path which has been followed by the message; and

means for propagating the modified Synchronisation Status Message to neighbouring nodes using outgoing links,

5 wherein at least certain of the nodes in the network are arranged to introduce a delay in the propagation of the respective modified messages.

14. A node for use in a multi-node telecommunications network, the node comprising:

10 means for receiving on the or each of at least some of the incoming links to the node a Synchronisation Status Message incorporating the identities of the nodes through which the message has passed;

means for registering the path or path length of the or each Synchronisation Status Message as an attribute for the link on which it was received;

15 means for incorporating into one of the messages the identity of the node, thereby generating in the message a node path which has been followed by the message; and

means for propagating the modified Synchronisation Status Message to neighbouring nodes using outgoing links, after a predefined time delay.

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15. A method of synchronising nodes of a telecommunication network in which a master node is coupled to a Primary Reference Clock (PRC) and a plurality of slave nodes are each arranged to synchronise their internal clock to the PRC using data received on incoming data link, the method comprising:

25 propagating Synchronisation Status Messages through the network from the master node, with each slave node through which a message passes incrementing a distance counter contained in the message, thereby generating in each message a path length taken by the message;

introducing a delay in the propagation of the messages at at least certain of the
30 network nodes; and

for each of at least some of the incoming links of each node, registering the path length of a Synchronisation Status Message received on a link as an attribute for that link.

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16. A method of synchronising nodes of a telecommunication network in which a master node is coupled to a Primary Reference Clock (PRC) and a plurality of slave nodes are each arranged to synchronise their internal clock to the PRC using data
5 received on incoming data link, the method comprising:

propagating Synchronisation Status Messages through the network from the master node, with each node through which a message passes incorporating into the message its own identity, thereby generating in each message a path which has been followed by the message;

10 for each of at least some of the incoming links of each slave node, registering the path or path length of a Synchronisation Status Message received on that link as an attribute for that link; and

for each slave node, identifying the best incoming signalling link and synchronising on that link after a time delay, indicated by the path of the
15 Synchronisation Status Message received on that link, has elapsed, assuming that no better link is identified in the meantime.

17. A method of synchronising a node of a telecommunication network in which a master node is coupled to a Primary Reference Clock (PRC) and a plurality of slave
20 nodes are each arranged to synchronise their internal clock to the PRC using data received on an incoming data link, the method comprising:

sending a Synchronisation Status Message Request from the node to be synchronised to neighbouring nodes in the network;

25 returning Synchronisation Status Messages from the neighbouring nodes to the requesting node, said messages including a path which has been followed by the message from the master node;

synchronising said node on the incoming signalling link over which the message having the shortest path was received;

30 extending the path of the message having the shortest path to include the identity the receiving node; and

propagating the modified synchronisation message to at least certain of the neighbouring nodes.

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18. A node for use in a multi-node telecommunications network, the node comprising:

means for sending a Synchronisation Status Message Request to neighbouring nodes in the network;

5 means for receiving on incoming links to the node, respective Synchronisation Status Messages incorporating the identities of the nodes through which the messages have passed;

means for registering the paths or path lengths of the Synchronisation Status Messages as attributes for the respective links on which they were received;

10 means for incorporating into the message having the shortest path length the identity of the node, thereby generating in the message a path which has been followed by the message; and

means for propagating the modified Synchronisation Status Message to at least certain neighbouring nodes using outgoing links.

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19. A method of synchronising a node of a telecommunication network in which a master node is coupled to a Primary Reference Clock (PRC) and a plurality of slave nodes are each arranged to synchronise their internal clock to the PRC using data received on incoming data link, the method comprising:

20 sending a Synchronisation Status Message Request from the node to be synchronised to neighbouring nodes in the network;

returning Synchronisation Status Messages from the neighbouring nodes to the requesting node, said messages including a path length which has been taken by the message from the master node;

25 synchronising said node on the incoming signalling link over which the message having the shortest path length was received;

extending the path of the message; and

propagating the modified synchronisation message to at least certain of the neighbouring nodes.

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